

What is claimed is:

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A radially expandable tape-reinforced tubular vascular graft, comprising:
a tubular PTFE base graft formed by a preliminary step of expansion so as
to have an expanded porosity and an expanded diameter; and

5 a reinforcing tape spirally wrapped around the tubular base graft in its
expanded diameter, the reinforcing tape being initially formed by a preliminary step
of expansion so as to have an expanded porosity; and wherein

10 the combined tubular PTFE base graft in its expanded diameter and the
expanded reinforcing tape are radially reduced in size to a radially decreased
diameter to form the radially expandable tape-reinforced tubular vascular graft
suitable for introduction and re-expansion of the base graft in the vasculature, each
of the base graft and tape in the vascular graft prior to re-expansion of the base graft
having a porosity less than its expanded porosity.

15 2. The vascular graft of claim 1, wherein the preliminary step of expansion of
the tubular PTFE base graft is accomplished by heating the base graft to a temperature of
less than the crystalline melting point of the PTFE and longitudinally expanding it to a
length at least twice its original size.

20 3. The vascular graft of claim 2, wherein the tubular PTFE base graft is
sintered after the preliminary step of expansion and prior to being radially reduced in size.

4. The vascular graft of claim 1, wherein the combined tubular PTFE base
graft in its expanded diameter and the reinforcing tape are radially reduced in size by
heating.

25 5. The vascular graft of claim 4, wherein the combined tubular PTFE base
graft in its expanded diameter and the reinforcing tape are radially reduced in size by
positioning the combination around a first cylindrical mandrel having an outside diameter
smaller than the inside diameter of the base graft and heating to a sintering temperature.

30 6. The vascular graft of claim 4, wherein the combined tubular PTFE base
graft in its expanded diameter and the reinforcing tape are radially reduced in size in
increments by positioning the combination around a series of progressively smaller

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cylindrical mandrels having outside diameters always smaller than the inside diameter of the base graft and heating to a sintering temperature.

7. The vascular graft of claim 1, wherein the expanded diameter of the tubular base graft is at least 5% greater than the reduced diameter.

5 8. The vascular graft of claim 1, wherein the expanded diameter of the tubular base graft is at least 66% greater than the reduced diameter.

9. The vascular graft of claim 1, further including an anchoring mechanism coupled to the vascular graft for securing the graft to a vascular wall.

10 10. The vascular graft of claim 1, further including a stent coupled to the vascular graft.

11. The vascular graft of claim 1, further including a reinforcing PTFE filament spirally wound around the reinforcing tape.

12. A radially expandable tape-reinforced tubular vascular graft, comprising:
15 a tubular PTFE base graft having a diameter; and
a reinforcing tape wrapped into a spirally wound tube, the reinforcing tape being initially formed by a preliminary step of expansion so as to have an expanded porosity, the tube having an expanded diameter larger than the diameter of the base graft; and wherein
20 the reinforcing tape tube is radially shrunk from the expanded diameter to a reduced diameter and applied to the outside of the tubular PTFE base graft to form the radially expandable tape-reinforced tubular vascular graft suitable for introduction and expansion in the vasculature, the tape tube in the vascular graft prior to expansion having a porosity less than its expanded porosity.

25 13. The vascular graft of claim 12, wherein the preliminary step of expansion of the reinforcing tape is accomplished by heating the tape to a temperature of less than the crystalline melting point of the PTFE and longitudinally expanding it along its length direction.

14. The vascular graft of claim 13, wherein the reinforcing tape is sintered after the preliminary step of expansion and prior to being applied to the outside of the tubular PTFE base graft.

5 15. The vascular graft of claim 12, wherein the reinforcing tape is fused by heating to the tubular PTFE base graft after being applied to the outside thereof.

16. The vascular graft of claim 12, wherein the expanded reinforcing tape tube is radially reduced in size by heating.

10 17. The vascular graft of claim 16, wherein the expanded reinforcing tape tube is radially reduced in size by positioning it around a first cylindrical mandrel having an outside diameter smaller than the inside diameter of the tube and heating to a sintering temperature.

18. The vascular graft of claim 12, wherein the expanded diameter of the tube is at least 5% greater than the reduced diameter.

15 19. The vascular graft of claim 12, wherein the expanded diameter of the tube is at least 66% greater than the reduced diameter.

20. The vascular graft of claim 12, further including an anchoring mechanism coupled to the vascular graft for securing the graft to a vascular wall.

21. The vascular graft of claim 12, further including a stent coupled to the vascular graft for securing the graft to a vascular wall.

20 22. The vascular graft of claim 12, further including a reinforcing PTFE filament spirally wound around the reinforcing tape.

abstract